

Claims

We claim:

1. A method of delivering a replacement fluid to a patient undergoing a predefined blood extracorporeal blood treatment, comprising the steps of:

5 purchasing multiple infusible fluids each in a respective container and all being in such numbers and volumes as to form, when combined, an admixture defining an isotonic replacement fluid appropriate for said patient undergoing said predefined blood extracorporeal blood treatment;

10 said volumes being integral numbers of volumes of standard containers used for packaging said infusible fluids;

combining said multiple fluids and supplying it for infusion into said patient.

20 2. A method as in claim 1, wherein said step of purchasing includes purchasing at least one container of half-normal saline solution containing a total volume of 1 unit, purchasing at least one second volume container of ringers solution containing a total volume of 3 units, and purchasing at least one third volume container of sodium lactate for injection containing a total volume of 1 unit.

3. A method as in claim 1, wherein said half-normal saline is substantially 0.45% NaCL, said Ringers for injection is substantially Na 147.5 mEq/L; Ca 4.5 mEq/L; K 4 mEq/L; and Cl 156 mEq/L); and said sodium lactate for injection is substantially Na 167 mEq/L and Lactate 167 mEq/L.

4. A method as in claim 1, wherein said step of combining includes connecting said respective containers to a fluid line connected for infusion into said patient.

5. A method as in claim 4, wherein said step of connecting includes flowing fluids through a manifold and into said fluid line.

6. A method as in claim 1, wherein said step of combining includes flowing fluid from said respective containers into a common container and said step of supplying
5 includes connecting said common container to a fluid line for infiltration into a patient.

7. A method of providing a replacement fluid for infusing a patient during an extracorporeal blood treatment that causes a loss of water and electrolytes from said patient, comprising the steps of:

obtaining respective containers of electrolyte/water mixtures that possess a
10 property that makes them appropriate for injection;

combining contents of said containers in such proportion as to form a properly balanced replacement fluid;

supplying said replacement fluid to a patient during a treatment;

said step of combining taking place at a location substantially the same as said
15 step of supplying.

8. A method as in claim 7, wherein said step of obtaining includes obtaining at least one container of half-normal saline solution containing a total volume of 1 unit, obtaining at least one second volume container of ringers solution containing a total volume of 3 units, and obtaining at least one third volume container of sodium lactate for
20 injection containing a total volume of 1 unit.

9. A method as in claim 7, wherein said half-normal saline is substantially 0.45% NaCL, said Ringers for injection is substantially Na 147.5 mEq/L; Ca 4.5 mEq/L; K 4

mEq/L; and Cl 156 mEq/L); and said sodium lactate for injection is substantially Na 167 mEq/L and Lactate 167 mEq/L.

10. A method as in claim 7, wherein said step of combining includes connecting said respective containers to a fluid line connected for infusion into said patient.

5 11. A method as in claim 10, wherein said step of connecting includes flowing fluids through a manifold and into said fluid line.

12. A method as in claim 7, wherein said step of combining includes flowing fluid from said respective containers into a common container and said step of supplying includes connecting said common container to a fluid line for infiltration into a patient.

10 13. A method as in claim 7, wherein each of said electrolyte/water mixtures is individually regulatory-cleared for injection.

14. A package of materials for performing an extracorporeal blood treatment, comprising:

packaging materials enclosing:

15 at least one of a blood processing machine, a tubing set for use in a blood processing machine, a container for holding replacement fluid, a manifold for combining fluids from multiple containers, and a set of containers containing components that when combined define a replacement fluid;

20 at least one document describing or pointing to instructions for a method of providing a replacement fluid, the method including the steps of:

obtaining multiple infusible fluids each in a respective container
and all being in such numbers and volumes as to form, when combined, an

admixture defining an isotonic replacement fluid appropriate for said patient undergoing said predefined blood extracorporeal blood treatment; said volumes being integral numbers of volumes of standard containers used for packaging said infusible fluids.

5 15. A package as in claim 14, wherein said method further includes the step of combining contents of said respective containers via a manifold with inlets for each of said respective containers and an outlet for said replacement fluid admixture.

10 16. A package as in claim 14, wherein said method further includes the step of combining contents of said respective containers in a single container connectable to supply replacement fluid to a patient.

17. A package as in claim 14, wherein instructions defining said method indicate manufacturer part numbers for said respective containers.

18. A package as in claim 14, wherein said step of obtaining includes obtaining containers of fluids that are regulatory-cleared for infusion.

15 19. A package as in claim 18, wherein instructions defining said method indicate manufacturer part numbers for said respective containers.

20 20. A package as in claim 14, wherein said step of obtaining includes obtaining containers of half-normal saline solution containing a total volume of 1 unit, obtaining containers of ringers solution containing a total volume of 3 units, and obtaining containers of sodium lactate for injection containing a total volume of 1 unit.

21. A package as in claim 20, wherein said half-normal saline is substantially 0.45% NaCL, said Ringers for injection is substantially Na 147.5 mEq/L; Ca 4.5 mEq/L;

K 4 mEq/L; and Cl 156 mEq/L); and said sodium lactate for injection is substantially Na 167 mEq/L and Lactate 167 mEq/L.

22. A package as in claim 14, wherein said method wherein said method further includes the step of combining contents of said respective containers at a location that is
5 the same as a location for treating said patient.

23. A method of infusing replacement fluid into a patient undergoing continuous extracorporeal blood treatment, comprising the steps of:

providing at least one standard volume container of half-normal saline solution containing a total volume of 1 unit;

10 providing at least one second standard volume container of ringers solution containing a total volume of 3 units;

providing at least one third standard volume container of sodium lactate for injection containing a total volume of 1 unit;

15 said half-normal saline, said ringers solution, and said sodium lactate for injection being regulatory cleared fluids for injection;

combining said at least one first, said at least one second, and said at least one third standard volume containers *in situ* for infusion into said patient during a blood treatment procedure requiring fluid replacement.

20 24. A method as in claim 23, wherein said step of combining includes flowing component fluids into a header from which a combined fluid is provided to a blood processing machine.

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25. A method as in claim 23, wherein said step of combining includes transferring containers of different fluids into a single vessel and flowing fluid from said single vessel into a blood processing machine for infusion into a patient.

26. A method as in claim 23, wherein said containers contain, in combination the
5 following proportionate quantities of solutions:

one part half-normal saline (0.45% NaCl);

three parts Ringers for injection (Na 147.5 mEq/L; Ca 4.5 mEq/L; K 4 mEq/L;
and Cl 156 mEq/L); and

one part sodium lactate for injection (Na 167 mEq/L and Lactate 167 mEq/L).

27. A package of materials for performing an extracorporeal blood treatment,
10 comprising:

at least one of a blood processing machine, a tubing set for use in a blood
processing machine, a manifold for combining fluids from multiple containers,
and a set of containers containing components that when combined define a
15 replacement fluid;

at least one document describing or pointing to instructions for a method
of providing a replacement fluid, the method including the steps of:

obtaining respective containers of electrolyte/water mixtures that
possess a property that makes them appropriate for injection;

20 combining contents of said containers in such proportion as to
form a properly balanced replacement fluid;

supplying said replacement fluid to a patient during a treatment;

said step of combining taking place at a location substantially the same as said step of supplying.

28. A method of delivering a replacement fluid, comprising the steps of:

providing an infusion controller configured to deliver fluids through multiple lines

5 in a predetermined proportion;

connecting to said infusion controller lines from multiple containers each containing an infusate which when combined in accord with said predetermined proportion forms a physiologically-correct replacement fluid for replacing fluids lost during a predefined blood treatment;

10 combining the flows through said multiple lines into an infusion flow and delivering the same to a patient during a blood treatment process.

29. A method as in claim 28, wherein said step of connecting includes connecting said lines from multiple containers to at least two infusion pumps.

30. A method as in claim 28, wherein said step of connecting includes connecting
15 said lines from multiple containers to at least two infusion pumps controlled by a common control signal.